

Amendments to the Specification:

Please replace the paragraphs following the heading **Description of the Preferred Embodiments** on pages 6-11 of the original application with the following paragraphs to delete reference to the character "56":

In the following description, like reference characters designate like or corresponding parts throughout the several views. Also in the following description, it is to be understood that such terms as "forward," "rearward," "front," "back," "right," "left," "upwardly," "downwardly," and the like are words of convenience and are not to be construed as limiting terms.

Referring now to the drawings in general and Figure 1 in particular, it will be understood that the illustrations are for the purpose of describing a preferred embodiment of the invention and are not intended to limit the invention thereto. A perspective partial view of the locking window 10 is shown in Figure 1. The window latch 12 includes a housing 22 fastened to one sash of the frame 14 and a locking arm catch 20 having a cam detent 21 fastened to another corresponding sash of the frame 14 and opposite to the housing 22. As seen in Figures 2A and 2B, a cam latch 16 includes an actuator arm 26 and locking arm 30 pivotally mounted through an aperture in the housing 22.

The window 10 is locked by pivotally moving the actuator arm 26 inward toward the housing 22, causing the locking arm 30 to pivotally move away from the housing 22 and engage the cam detent 21 of the locking arm catch 20. The locking arm 30 disengages the cam detent 21 of the locking arm catch 20 and unlocks the window 10 when the actuator arm 26 pivotally moves away from the housing.

As best seen in Figures 2A, 3A, 4A, and 4B, in the locked position, the locking arm 30 protrudes beyond the face of the housing 22. By extending into the locking arm catch 20 on the corresponding sash of the frame of the window 10, a cam wall 36 of the locking arm 30 engages the cam detent 21. At the same time, the actuator arm 26 is to one side of the housing 22 of the window latch 12 so as to be substantially aligned with the face of the housing 22. At the advance end of the cam wall 36, the locking arm 30 may include an incline 38, seen in Figures 2A, 2B,

4A, 4B, 5A, 5B and 6A, to better facilitate insertion of the locking arm 30 into the locking arm catch 20 to engage cam detent 21.

As best seen Figures 5A and 5B, in the open position, the locking arm 30 is withdrawn from the locking arm catch 20 and concealed within the housing 22 of the window latch 12. At the same time, the actuator arm 26 of the cam latch 16 is at another side of the housing 22 of the window latch 12 so as to be substantially aligned with the face of the housing 22 at the other side of the window latch 12.

As previously mentioned, the cam latch 16 includes an actuator arm 26 and a locking arm 30. The cam latch 16 pivots about a pivot point 32. The housing 22 has an aperture at the pivot point 32 to accommodate a pivot fastener 28, 28'. The length of the actuator arm 26 is approximately twice the length of the locking arm 30, thereby providing a mechanical advantage in opening and locking the window 10.

As seen in Figures 3A, 3B, 4A, 5A, 6A and 6B, the housing 22 is strengthened by support walls 46, 50 located between an aperture 40 or 70 for attachment and the pivot point location 32.

The pivot fastener 28, 28' is shown in Figures 2A and 6A in a top exploded view; in Figures 4 and 5 in through sectional views; and in Figure 6B in a bottom exploded view of the window latch 12. The pivot fastener 28, 28' allows the cam latch 16 to pivot freely about the pivot point 32 while the window latch 12 is affixed to the window frame 14. The pivot fastener 28, 28' includes a male key lock portion 28 and a female key lock portion 28', both having a central aperture that allows a fastener 48 to pass therethrough. In the preferred embodiment, the fastener 48 may be any threaded fastener, such as a screw. The female key lock portion 28' is part of the locking arm 30 of the cam latch 16. It will be understood by those skilled in the art that the female key portion 28' may instead be part of the actuator arm 26 and the male portion 28 may be part of the locking arm 30. Further, each of the male key lock portion 28 and the female key portion 28' may include a complementary alignment feature 82 that facilitates the rapid assembly of pivot fastener 28, 28' so that actuator arm 26 and locking arm 30 align properly with the face of housing 22.

A housing 22 having at least a single aperture 40 partially encloses both the locking arm 30 of the cam latch 16 and pivot fastener 28, 28', protecting them from debris that may be generated during construction or installation of the window frame 14 or window 10. The

aperture 40 serves as a first attachment point and, in the preferred embodiment, the housing 22 includes a second aperture 70 which serves as a second attachment point for the window latch 12.

Apertures 40 and 70 may each further include an internal retainer 44. An internal retainer 44 may be a small piece of plastic molded into the aperture 40 or aperture 70 that allows a fastener 72 to be temporarily secured in apertures 40 and 70 for packaging or shipping purposes and to prevent loss. Expediting the rapid assembly of window frames in a manufacturing environment is a further advantage of an internal retainer 44.

Each aperture 40 and 70 further may include a cavity 62 in its bottom surface to accommodate shavings generated when the window latch 12 is affixed to the window frame 14. Cavity 62 also may accommodate any pull-up of the window frame 14 during attachment of the window latch 12 to the window frame 14.

The window latch 12 may include structural features such as a detent 56 that limits the range of movement of the cam latch 16 relative to the housing 22. The limited of movement of the cam latch 16 may be accomplished through the cooperation of structural features of the housing 22 and the cam latch 16. Likewise these structural features may cooperate in manner that provide a user of the window latch 12 a feel or sound or both that allow the user to know whether the cam latch 16 is fully engaged or fully disengaged position. In this manner, a user may see, feel and hear that the window latch 12 fully engaged or fully disengaged position.

As may be best seen in Figures 3B, 4A, 4B 5A, 5B and 6B, the detent 56 may be a protrusion 60 extending from the housing 22 that cooperates with a groove 68 defined by the cam wall 36 and collar 58 of the locking arm 30. Figures 4A, 4B 5A, and 5B are through sections of the window latch 12 just below the bottom of the upper most inner surface and above the top of the lower most outer surface of housing 22. As seen in Figures 3B, 4A, 4B 5A, 5B and 6B the housing may include a pair of protrusions 60. As seen in Figures 4A, 4B 5A, and 5B the locking arm 30 may include a pair of grooves 68. The longer of the grooves 68 has a slightly enlarged diameter 64 at blind end. The presence of the enlarged diameter 64, which may resemble a barbell shaped region, reduces a diameter of the collar 58 creating a recess for seating one protrusion 60 when the locking arm 30 is moved to the position for engaging the cam detent 21 as shown in Figures 4A and 4B. In this manner, a user window latch experiences the

sensations of the one protrusion 60 seating in the recess at the blind end created by the enlarged diameter 64. In addition to seeing, the sensation may include the feel and audible snap of the cam latch 16 fully engaging. The shorter of the grooves 68 cooperates with the other of the protrusions 60 when the locking arm 30 is moved to the position for fully disengaging the window latch 21 as shown in Figures 5A and 5B.

Each protrusion 60 cooperates with a corresponding groove 68 and the collar 58. The protrusions 60 are located proximate to the pivot point 32 of the cam latch 16. In addition to the recess at the barbell shaped region 64 of the longer groove 68, the collar 58 includes regions having different diameters. As seen in Figures 4B and 5B, a smaller diameter region extends from the end of the shorter groove 68 to the start of the longer groove 68. Also as seen in Figures 4B and 5B, a larger diameter region extends from the transition from the smaller diameter region to the larger diameter region to the end of the longer groove 68. The transition from the smaller diameter region to the larger diameter region is opposite the barbell shaped region 64 of the longer groove 68. In addition, the collar 58 includes a groove 80 that is opposite to the end of the shorter groove 68. The pair of protrusions 60 mate with the grooves 68 and collar 58 of the locking arm 30.

In operation, as the cam latch 16 moves along its range of motion, protrusions 60 travel along the different diameter regions of collar 58, a portion of which may be within grooves 68. As seen in Figures 4A and 4B, when moving cam latch 16 to the fully engaged position, one protrusion 60 reaches the barbell shaped regions 64 while the other reaches groove 80. At this point, the one protrusion 60 enters a barbell shaped region 64 of groove 68, producing an audible snap. As seen in Figures 5A and 5B, when moving cam latch 16 to the fully disengaged position, one protrusion 60 reaches transition from the larger diameter region to the smaller diameter region of collar 58 while the other reaches the end of the shorter groove 68. At this point, the one protrusion 60 drops from the larger diameter region to the smaller diameter region of collar 58, producing an audible snap. The audible snap assists the user in determining whether the window latch 12 is in a fully engaged or fully disengaged position.

In addition to or in place of the structures discussed above, the window latch 12 further may include structural features such as a bushing 92 as a detent 56 that limits the range of movement of the cam latch 16 relative to the housing 22. .

As may be best seen in Figures 6A, 6B and 6C, the detent 56 may be a protrusion 94 extending from the bushing 92 that cooperates with a groove 98 in a recess 96 defined by the bottom surface of housing 22. The bushing 92 may include a resilient portion 90 that in the present example is created by using a gap 88 adjacent to protrusion 94. The resilient portion 90 acts to compress the bushing 92 to permit the movement of cam latch 16. The bushing 92 may include a pair of protrusions 94 and corresponding gaps 88. As seen in Figures 6A, and 6B the bushing 92 may fit on pivot fastener 28, 28' between the actuator arm 26 and the locking arm 30 and below housing 22 in recesses 96. Each protrusion 94 cooperates with a corresponding groove 98 and the housing 22. Bushing 92 is seated within recess 96 and protrusions 94 are initially aligned with corresponding grooves 98. The protrusions 94 may be located on the outer diameter of the bushing 92. It will be appreciated by those skilled in the art that the protrusion 94 and resilient region 90 may be included as part of the housing 22 and the groove 98 may be in the bushing 92. Any other structural combinations that accomplish at least one of the see, feel, hear and combination thereof functions are part of the present invention.

In operation, as the cam latch 16 moves along its range of motion, protrusions 94 travel from grooves 98 and the wall of recess 96 compresses the resilient region 90 of bushing 92. When moving cam latch 16 to the fully engaged position, the protrusions 94 reach their corresponding grooves 98. At this point, the resilient region 90 replaces the protrusions 94 to their original extended position so that while the protrusions 94 enter their corresponding grooves 68 an audible snap is produced. When moving cam latch 16 to the fully disengaged position, similar events occur. The audible snap assists the user in determining whether the window latch 12 is in a fully engaged or fully disengaged position.

As seen in Figures 4A, 4B, 5A and 5B, the locking arm catch 20 includes a cam detent 21 that the locking arm 30 engages. The locking arm catch 20 has at least one aperture 74. The aperture 74 serves as a first attachment point and, the locking arm catch 20 may include a second aperture 76 that serves as a second attachment point for the window latch 12.

Apertures 74 and 76 may each further include an internal retainer 44. A small piece of plastic molded into the aperture 74 or aperture 76 may act as an internal retainer 44 that allows a fastener 72 to be temporarily secured in apertures 74 and 76 for packaging or shipping purposes,

and to prevent loss. Expediting the rapid assembly of window frames in a manufacturing environment is a further advantage of an internal retainer 44.

Each aperture 74 and 76 further may include a cavity 62 in its bottom surface to accommodate shavings generated when the locking arm catch 20 is affixed to the window frame 14. Cavity 62 also may accommodate any pull-up of the window frame 14 during attachment of the window latch 12 to the window frame 14.

The window latch 12 may be formed from any lightweight durable material, such as a lightweight metal including aluminum, or a polymeric material. Applicants contemplate that suitable materials may be characterized by at least one of high strength, high rigidity, very good impact resistance, good elastic properties, dimensional stability, low tendency to creep, and simple processing. Preferably, suitable materials may be characterized by a plurality of the above. Applicants have found that among polymeric materials, polyamides (also known as nylons) to work well and, in particular, that polyamides including a filler may work well. In the preferred embodiment, the material used to form the window latch 12 was made using commercially available polyamides such as the “ULTRAMID®” polyamide sold by BASF Corporation of Mount Olive, New Jersey. These ULTRAMID® polyamide materials, their applications, properties and processing as described in a publication by BASF Plastics entitled “ULTRAMID®” Polyamides, the subject matter of which is incorporated in its entirety herein by reference.

Applicants contemplate that a semi-crystalline Nylon 6 (PA6) containing about 30 percent glass fiber may be preferred. One such material is manufactured by Hughes Supply & Manufacturing Company of Thomasville, Inc. of Thomasville, North Carolina under the trademark “FIBERTRON™” material and has the properties presented below in Table 1.